Texte zu den geplanten neuen EU-Regelungen zur umweltgerechten Produktgestaltung und zur Energieverbrauchskennzeichnung in der Beleuchtung – Zusammenstellung [1] des Umweltbundesamtes (UBA), Deutschland

Entwürfe vom Dezember 2018
von Regelungsausschuß und Fachgespräch

Stellungnahme des Herstellerverbandes LE [2] vom 17. Januar 2019

– SVM-Höchstwert für den Stoboskopeffekt –

Hinweis: Bitte beachten Sie, daß der angehängte Text nur in Englisch verfaßt ist.

EN: Information on the coming EU Lighting Regulations – Ecodesign and Energy Labelling – Compilation [1] of the Federal Environment Agency (UBA), Germany

Drafts of December 2018
from Regulatory Committee and Technical Expert Meeting

Comments by the Industry Association LE [2] as of 17 January 2019

– SVM limit value for stroboscopic effect –

FR: Informations sur les futures réglementations de l'UE concernant l'éclairage – l'écoconception et l'étiquetage énergétique – Compilation [1] de l'Agence Fédérale de l'Environnement (UBA), Allemagne

Projets du décembre 2018
du comité de réglementation et de la réunion d'experts technique

Commentaires de l'association de producteurs LE [2] de 17 janvier 2019

– Valeur maximale du SVM pour l'effet stroboscopique –

Indication : Veuillez noter que le présent texte n'est disponible qu'en anglais.

---

[1] https://www.eup-network.de/de/eup-netzwerk-deutschland/offenes-forum-eu-regelungen-beleuchtung/dokumente/texte/

[2] LE = Lighting Europe; http://www.lightingeurope.org/

DE: ↓ **EN**: → page III **FR** : → page IV

Texte im Offenen Forum (**abc** = vorliegender Text)

Abkürzungen: ● EG = Europäische Gemeinschaft ● EU = Europäische Union ● SVM = Stroboscopic Visibility Measure

EN

Documents in the Open Forum (**abc** = text at hand)

- **Existing EC and EU Regulations**
- **Studies of the European Commission**
- **Draft regulations**
  - Earlier drafts
  - EU Commission's drafts of October for WTO Notification
  - EU Commission's drafts of November 2018 for the Regulatory Committee on ecodesign and for the Technical Expert Meeting on energy labelling
  - **Drafts of December 2018 from Regulatory Committee and Technical Expert Meeting**
    - **Product design**
      - Room documents
      - Voting result
      - **Comments**
        - **Manufacturer association Lighting Europe**
          - Main concerns (17 January 2019)
          - **SVM limit value for stroboscopic effect (17 Jan. 2019)**
    - Product information
  - Drafts of January/February 2018
- **Public Consultations at EU level**
- **Discussion in the Open Forum**
- **Further documents**

Abbreviations: ● EC = European Communities ● EU = European Union ● SVM = Stroboscopic Visibility Measure

FR

Documents dans le forum ouvert (**abc** = présent document)

- **Règlements existants de la CE et de l'EU**
- **Études de la Commission européenne**
- **Projets de règlements**
  - Projets antérieurs
  - **Projets du décembre 2018 du comité de réglementation et de la réunion d'experts technique**
    - **Conception des produits**
      - Documents de séance
      - Résultat du vote
      - **Commentaires**
        - **Association de producteurs Lighting Europe**
          - Préoccupations principales (17 janvier 2019)
          - **Valeur maximale du SVM pour l'effet stroboscopique (17 janvier 2019)**
    - Informations relatives aux produits
  - Projets du janvier / février 2019
- **Consultations publiques au niveau de l'UE**
- **Discussion dans le Forum Ouvert**
- **Autres documents**

Abréviations : ● CE = Communauté europ. ● UE = Union europ. ● SVM = Stroboscopic Visibility Measure

---

Es folgt ein unveränderter Originaltext.

EN: The following is an unmodified original text.

FR: Ce qui suit est un texte original.

LIGHTINGEUROPE
THE VOICE OF THE LIGHTING INDUSTRY

Brussels, 17January 2019

Technical feedback on the SVM ≤ 0.4 limit (stroboscopic effect) in the draft ecodesign requirements for lighting

Summary

The Regulatory Committee on Ecodesign and Energy Labelling has underestimated the impact of specifying a limit of SVM ≤ 0.4 in the Ecodesign Regulation on light sources. Therefore, SVM limits should be returned to the previous level of 1.6. Also, the reference exempting HID and CRI should be removed when establishing LED/OLED requirements.

LightingEurope urges the European Commission to include the following correct SVM requirements in Annex II, Table 4 of the draft ecodesign legislation for lighting:

Stroboscopic effect for LED and OLED MLS	SVM ≤ 1.6 at full load (except for light sources intended for use in outdoor or industrial applications)

The following chapters explain the reasons why the SVM value should be maintained at ≤ 1.6.

1. Arguments for keeping SVM ≤ 1.6

a) The requirement of SVM ≤ 1.6 was already included in the European Commission's draft text of the Ecodesign Regulation, following a full consultation process, including an impact assessment.
b) A last-minute change to SVM ≤ 0.4 would result in an unintended phase-out of several product families (*see 2.b*).
c) This limit of SVM ≤ 1.6 in the text of the European Commission's previous ecodesign draft is based on NEMA 77:2017, the only globally available standard giving a guideline for product limits related to stroboscopic effect.
d) There is no reason to make stricter requirements on stroboscopic effect for LED lamps than for conventional lamps, which have been perfectly acceptable to the market for many decades.[1]

[1] Typical SVM values for conventional lamps:
- incandescent lamps (50 Hz) SVM between 0.3 and 0.8;
- magnetic ballasted fluorescent SVM between 1.0 and 1.4; and
- magnetic ballasted HPS SVM between 2.5 and 4.0.

e) The recent EU SCHEER “Final Opinion on potential risks to human health of Light Emitting Diodes (LEDs)” (June 2018) did not find any health issues caused by stroboscopic effect.
f) A stricter SVM limit will not lead to additional benefits to the European consumer. As there are no health issues caused by stroboscopic effect found by the EU SCHEER report (*see 1.e*), and all test SVM levels (up to SVM 2.0) are equally acceptable by the participants in the IEA 4E SSL Annex interim report (*see 3.d*), there are no benefits supporting stricter SVM requirements.

2. Consequences for the European lighting market if SVM becomes ≤ 0.4

a) The majority of existing LED MLS lamps on the European market do **not comply** with this requirement.
b) This requirement would result in an **unintended phase-out** from the European market of, amongst others, the **following LED product families**: dimmable glass filament bulbs and candles, T5 TLED, capsules G9, R7s, and SONT types. The unintended phase-out of LED MLS lamps would hamper the switch to LED lighting and slow down energy savings in Europe, even though the EU has decided to phase out the conventional technologies that these products are meant to replace. In addition, the removal of existing technologies due to their inability to achieve the required levels of energy efficiency would result in no suitable replacement lamp being available for existing lamp sockets.
c) **Unnecessary waste and costs for consumers**: the latter point has a potentially enormous impact on consumers who will not be able to find light sources for the luminaires they already have in their homes or offices anymore, leaving them with useless luminaires producing no light (i.e. empty sockets).
d) A **technical solution** is not possible for dimmable lamps, lamps with high power, or with small caps (*see 2.b*). A technical solution is possible (at a considerable cost for both consumers and industry) for the following product families: non-dimmable lamps, lamps with low power and with large enough size, as well as high power lamps (more than 10 W). High power lamps, such as TLED and Highbay, will require even higher costs.
e) The **technical solution** to improve the SVM performance to **≤ 0.4** requires adding a capacitor that has a certain **size**. The mains current will then become zero every 10 milliseconds. During the period that the current approaches and leaves the zero-current point, a minimum value of current must be preserved. Therefore, energy must be stored for these periods, and this energy is stored in capacitors. Many LED MLS lamps simply **lack physical space** to add the necessary electronic components to get to such a low SVM level. Especially for lamps with a compact outline (e.g., halogen replacements) it is impossible to create the required space. In addition, the inclusion of one or more capacitors will result in higher levels of in-rush current with potential impact on MCB components in the electrical wiring of the building. As a result, lamps might become larger in size, resulting in a different light distribution and possible heating effects. Larger lamps means that luminaires then need to be redesigned, to adapt to the new bigger lamps, leaving a number of luminaires already on the market or in the consumer’s offices or homes with an empty socket.
f) **Undesired impact on other parameters**: for retrofit tubes (TLED), lowering the SVM level requires an additional first electronic stage in the driver. This will be costlier and require more space in the lamp, which will negatively impact retrofit TLED tubes: an additional power-stage in the driver will inherently introduce additional electrical losses (a first estimation is about 3-5 %), having a **negative impact on energy efficiency**. Additional effects on power factor and harmonics are expected and need to be

assessed separately. For colour tuneable light sources, a low SVM requirement will impact the reference control setting, possibly resulting in a forced choice of a less energy efficient setting.

3. Comments to the IEA 4E SSL Annex interim report on SVM values

a) This is an interim report that has **not been peer-reviewed** and the final report of the study has not been published in a scientific journal.[2] The disclaimer present in the report already raises doubts as to whether this preliminary report should be the basis for a regulation with wide implications for commercial products. The report then states that "This experiment has been conducted to provide evidence for a limit on SVM where, at present, no evidence exists." – This is **wrong**, as there is a peer-reviewed conference publication at CIE 2017 that provides evidence for limits on SVM in different applications.[3] Four perception experiments were conducted, measuring acceptability of the stroboscopic effect in an office application and a limit of SVM = 1.5 was proposed. Acceptability limits can also be derived from the peer-reviewed journal paper of Bullough et al, corresponding to SVM = 2.[4] Thus, there are at least two papers that could be used to define limits, but that were not even mentioned in this report.
b) The **report does not conclude** that SVM ≤ 0.4 should be a recommended legal requirement. It also does not include an impact assessment on any possible technical consequences.
c) The interim report shows significant differences in results between the two different test locations. Combining the test results into one set of values is therefore of questionable validity. It should also be noted that **no cross-verification of previous research has been done** to check comparability of results.
d) The experiment involved subjects studying a high contrast object and actively looking for an effect, which **does not correspond to real life conditions**. It should thence be considered how the measurements realistically translate into the workplace or domestic environment.
e) The **study tested the visibility** of the stroboscopic effect and not its potential impact on health. The rotating disc method used in the study gives very similar results to the rotating disc experiments done in earlier studies by M. Perz and confirms the validity of SVM as a visibility measure to detect stroboscopic effect. [5]
f) The study tested the acceptability of SVM levels by participants under laboratory conditions. Figure 3 shows that the **acceptability for all tested SVM levels is approximately the same**. The participants found all SVM levels equally acceptable. This means that any limitation on acceptability on SVM is not supported by this study.
g) The **study did not test health effects** caused by the stroboscopic effect to participants. Therefore, no conclusions on acceptability levels and health effects can be drawn based on this interim report. The summary of the report confirms that "the IEA 4E SSL Annex commissioned this study to test the visibility of the stroboscopic effect." Thus the

[2] Jennifer A. Veitch and Christophe Martinsons, *Interim Report: Visual Perception under Energy-Efficient Light Sources – Detection of the Stroboscopic Effect Under Low Levels of SVM* (11 December 2018: NRC-CNRC, CSTB, and IEA 4E Solid State Lighting Annex). < www.eceee.org/static/media/uploads/site-2/news/iea_4e_ssl_annex_svm_report.interim_results3.pdf > (seen: 16 January 2019).

[3] M. Perz and D. Sekulovski, "Acceptability criteria for the stroboscopic effect visibility measure," in *CIE 2017 Midterm Meeting "Smarter Lighting for Better Life"* (2017: CIE, Jeju (ROK)).

[4] J. D. Bullough, K. S. Hickcox, T. R. Klein, and N. Narendran, "Effects of flicker characteristics from solid-state lighting on detection, acceptability and comfort," *Light. Res. Technol.* 43 (2011): 337–348.

[5] M. Perz, D. Sekulovski, I. Vogels, and I. Heynderickx, "Stroboscopic effect: contrast threshold function and dependence on illumination level," *J. Opt. Soc. Am.* 35 (2018): 309-319; M. Perz, I. M. L. C. Vogels, D. Sekulovski, L. Wang, Y. Tu, and I. E. J. Heynderickx, "Modeling the visibility of the stroboscopic effect occurring in temporally modulated light systems," *Light. Res. Technol.* 47 (2015): 281–300.

data does not inform concerning possible effects of SVM level on detection of the phantom array, nor on complex phenomena like eyestrain, headache, reading or cognitive performance.

h) When SVM = 0, there can be no risk from stroboscopic effect, because there is no light modulation. And yet, 10 % of the tested persons claimed that they detected stroboscopic effect when SVM = 0! Both SVM visibility studies from Veitch/Martinsons and Perz find a similar result that ~10 % of the test persons **claim to see an effect when this effect is actually not there** (at SVM = 0). In the Veitch/Martinsons study, the same ~10 % of the test persons claim to see this effect at SVM = 0.4. This clearly shows that, at SVM at 0.4 or lower, the test persons are not able to see any change in visibility. Therefore, any limit at SVM at 0.4 or below does not make any sense, because the visibility and acceptability boundaries are not identical.

i) **Vague and misleading wording** is used throughout the report:
Example 1: The report states that "An SVM > 2.0 caused virtually all of the participants to perceive stroboscopic effects of the disk all of the time." Inexperienced readers might interpret this to mean that "virtually all people will perceive stroboscopic effect all the time." This is false, since there must be motion at sufficient speed, with high contrast between the moving object and the background, and in the observer's direct line of view, in order for it to be detected. In addition, only the moving object will show the effect. Only occasionally the effect will be visible in typical indoor environments when these conditions may be met.
Example 2: The words "all the time" appear many times in the document, misleading the reader to wrong conclusions.

j) The report mentions "the **precautionary principle**" with the implication that regulators should set strict limits for TLA, because of potential health issues. However, conventional lighting has been available with a range of SVM values for decades. **A specification of SVM = 0.4 would even eliminate a large range of incandescent lamps,** which have not been associated with ill effects from TLA for over 100 years. The precautionary principle does not justify a stricter SVM limit that applies to all applications.

k) As stated above, **visibility of the stroboscopic effect is not tied to acceptability**. The report misinterprets CIE and NEMA: "the visibility threshold (i.e., SVM = 1) is not a guarantee of acceptability of the visible phenomenon," implying that SVM should be set lower than 1, when the intention of CIE and NEMA is that values above 1 may also be acceptable (depending on the application). When stroboscopic effect is observed, an object that would appear as a distorted streak in non-strobing light appears as an array of objects. The effect on the retina is the same as observations of periodic structures that are common in everyday life (e.g., fences, brick walls, rows of trees, striped clothing, and spoked wheels) – an array of images is formed on the retina. Observation of an array of objects is not intrinsically unacceptable. There are other references indicating higher acceptability of stroboscopic effect, as stated in the above point.[6]

[6] Perz and Sekulovski, "Acceptability criteria for the stroboscopic effect visibility measure;" Bullough et al. "Effects of flicker characteristics."

4. Comments to the 12 December 2018 cover letter from the Swedish Energy Agency (SEA) to the Regulatory Committee

a) The SEA letter mentions "critical health conditions of migraines, photosensitive seizures and autistic behaviour."[7] Photosensitive seizures and migraines are known to be potentially triggered by *flicker*, but not by stroboscopic effect. A link between autistic behaviour and stroboscopic effect is not proven. Stroboscopic effect is only linked to potentially causing headaches and fatigue, and that only for high values of SVM. **The statement on health effects in the SEA letter is misleading**.
b) The proposed limit of SVM ≤ 1.6 (for indoor applications only) from the Commission's proposed ecodesign draft text comes from the NEMA 77:2017 guideline and this is **the only published guideline for SVM** in a standard worldwide. The value is based on setting the same acceptability requirements for LED lighting as was acceptable in the market for conventional lighting. There is no reason to be stricter for a different technology.
c) **OSRAM does not support** the statement that "the incremental manufacturing cost increase for a low SVM driver was approximately ten eurocents." This might be true for some product types, but cannot be used as statement for all product families. Besides, any increase in manufacturing costs will result in an increase in retail price for customers.
d) The fact that Mr Peter Erwin found products on the market with different SVM values only proves that not all manufacturers already take SVM into account when designing their products. Neither does this indicate the relative quantities or the distribution of product compliance. If only a very small percentage of products complied, or if all complying products were of the same generic type, this will still leave many existing lamp types with no suitable replacement, leaving currently installed lamp sockets with no possibility of a replacement lamp.
e) The **conclusion of the SEA cover letter is wrong**. There is no evidence of a negligible impact on retail prices and no evidence of protecting public health and wellbeing as the study did not test health effects.

5. Comments to the eceee news publication

a) This news article repeats the SEA cover letter and concludes that visibility of SVM is not good for health and that the public should be protected from any visibility of stroboscopic effect.[8] It is invalid to draw this conclusion from the referenced interim report.
b) This news article suggests a limit of SVM ≤ 0.4, based on the worst case suggestion from the SEA cover letter. The suggestion is made that with lack of further evidence, you simply use the strictest visibility limit tested, without any safety or health related evidence supporting the limit.

[7] Letter from Peter Bennich (Swedish Energy Agency) to the European Commission's Regulatory Committee on Ecodesign and Energy Labelling (Stockholm, 12 December 2018). < www.eceee.org/static/media/uploads/site-2/news/swecovernotesvm_study_181212.pdf > (seen: 16 January 2019).
[8] "New study provides evidence for more stringent "flicker" requirements in pending ecodesign lighting regulations," in eceee (14 December 2018). < www.eceee.org/all-news/news/new-study-provides-evidence-for-more-stringent-flicker-requirements-in-pending-ecodesign-lighting-regulations/ > (seen: 16 January 2019).

Contact

For further information on this topic, please contact Elena Scaroni, Policy Director, through elena.scaroni@lightingeurope.org.

LightingEurope is the industry association that represents the lighting industry in Europe. We are the voice of more than 1,000 lighting companies that employ more than 100,000 Europeans and create an annual European turnover of over € 20 billion. Our daily mission is to advocate and defend the lighting industry in Brussels, while reconciling it with ongoing EU policy aims. In doing so, we are dedicated to promoting efficient lighting practices for the benefit of the global environment, human comfort, and the health and safety of consumers. More information is available on: www.lightingeurope.org.